AIRCRAFT CIRCULARS

NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS

No. 27

DYLE AND BACALAN METAL MONOPLANE, D.B. 10
NIGHT BOMBER

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DYLE AND BACALAN METAL MONOPLANE, D.B. 10 NIGHT BOMBER*

(Equipped with Two 420 HP. Jupiter Engines)

By J. Serryer.

On its debut in aeronautic construction, the Dyle and Bacalan Company has made a large airplane with original characteristics and of interest from various viewpoints. The framework is made entirely of duralumin and special, high-resistance steel. The engineer, Dornier, is one of its most enthusiastic admirers.

It is perfectly adapted to various equipments, according to the use to be made of it. This adaptation is facilitated, in the first place, by the wide choice of engine with which it can be equipped, ranging in power from 840 to 960 HP., a sufficient margin to guarantee good performances, for certain uses, if it should be found to be overloaded.

The middle section of the wing is very thick and can be arranged either as a large passenger cabin or in compartments capable of holding many bomb racks.

This habitable type of wing, conceived and designed by the engineer, L. De Monge, several years ago, renders it possible to improve the fineness to a notable degree. We believe it has a future. This section, as exhibited at the "Salon," is equipped

*From "Les Ailes," December 2, 1926 and "L'Aerophile" Nov. 1-15, 1926.

for night bombing; the form adopted for the first sample airplane.

It is a rigidly braced thick-wing monoplane with a total span of 25 meters (82.02 feet), and consists of three separate sections: a central section having a thickness of 1.875 m (6.15 ft.), a chord of 5 m (16.40 ft.), and a span of same amount. Hence the wing ordinate of the central section is 37.5%. Each of the two symmetrical end sections is attached to the central section by ball and socket joints and has a uniform wing ordinate of 12%. Each wing has a span of 10 m (32.81 ft.), and a chord of 3.4 m (11.15 ft.); also a lateral dihedral of 3 degrees and a sweepback of 4° 30'. The ball-and-socket joints enable easy and quick disassembling of the wings. Each wing is braced by two oblique struts, of streamlined steel tubing. These struts are attached, at their lower ends, to the bottom of the central wing section and, at their upper ends, to the middle of the end sections.

Structurally considered, the central section is a girder, analogous to a bridge, and consequently very strong. Its framework consists of four principal longerons of special chrome-nickel steel, cross-braced by duralumin box girders. This central structure receives all the stresses from the attachments of the lateral wings, from the struts and from the tractive force of the engines. It is covered with fabric supported by light metal ribs.

The framework of the lateral sections comprises two idential spars, formed of high-resistance steel flanges and webs of thin

sheet steel open-worked in trellis. These spars are held in place by tie-beams and diagonal wires. The ribs are duralumin. At the points of fixation and at the wing tips they form veritable box girders. The leading edge is reinforced by sheet metal, the whole being covered with fabric.

The fuselage proper is rigidly attached to the central wing section and serves simply as a girder for supporting the tail unit. It is constructed of duralumin tubing with struts and cross beams joined by stamped gussets and the whole braced by piano wires.

The horizontal empennage consists of a stabilizer, adjustable during flight and having a single spar braced from the fuselage, and the elevator which is in two balanced parts.

The vertical empennage consists of a triangular fin and a slightly balanced rudder.

All the installations form an integrant part of the central wing section. In the very front end of the latter (when used as a bomber) is the gunner's post with two Lewis machine guns covering the upper hemisphere, while a third gun, firing below the fuselage, covers the dead angles. Next, and slightly elevated in order to increase the visibility, is the pilot's post, streamlined at the rear.

The normal load of bombs or freight is 750 kg (1653.5 lb.) but this can be increased to 1350 kg (2976.2 lb.) by carrying less fuel.

The engines now used on the D.B. 10 are two 420 HP. Jupiter 9 AB. These engines are attached to metal supports in the central wing section in such a way as to be easily removed. The engines are located far enough forward to diminish the interference of the propellers and the wing, an interference which has been found to be almost negligible.

Each engine is isolated, at the rear, by a metal partition. Provision has, however, been made for access to the engine during flight in such manner as to enable the inspection of all parts. The gasoline tanks are behind the engines and can be dropped during flight.

The D.B. 10, without alteration, can be equipped with 450 HP. Lorraine - Dietrich or any other engines.

There are two independent landing gears, one under each engine. Each gear has two wheels 900 × 165 mm (35.43 × 6.5 in.) supported by a light frame solidly connected with the central wing section by means of ball-and-socket joints. There is no continuous axle. The track gauge is 12 meters (39.37 ft.), which enables it to land more easily on rough ground.

The tail skid is a box girder of metal. It is mounted on sandows and is provided with springs for contact with the ground. It is orientable.

View and outline drawings are given in Figs. 1 and 2.

General Characteristics

Span	25.0 m	82.02 ft.
Length	13.6 "	44.62 "
Height	4.7 "	15.42 "
Wing area	93.0 m^2	1001.04 sq.ft.
Power: two 420 HP. Jupiter engines (= 840 HP.)		
Weight empty	3150 kg	6944.55 lb.
Useful load	2450 "	5401.32 "
Full load	5600 "	12345.87 "
Wing loading	60.10 kg/m^2	12.31 lb./sq.ft.
Power "	6.65 kg/HP.	14.46 lb./HP.

Performances

Speed near ground	195 km/hr (121.2 M.P.H.)
Speed at 4000 m (13123 ft.)	185 " (115.0 ")
Climb to 5500 m (18045 ")	60 minutes
Theoretical ceiling	6000 m (19685.0 ft.)

Wing of Dyle and Bacalan D.B. 10 (Fig. 3)

The large monoplane D.B. 10, with two 400 HP. Lorraine engines, will soon undergo its tests. Our photo shows one of the wings, detached from the very thick central section, whose profile is that of a very thick wing. The total span is 25 m (82.02 ft.). The wing is made of duralumin and special high-resistance Holtzer steels for the spars.

Translation by Dwight M. Miner,
National Advisory Committee
for Aeronautics

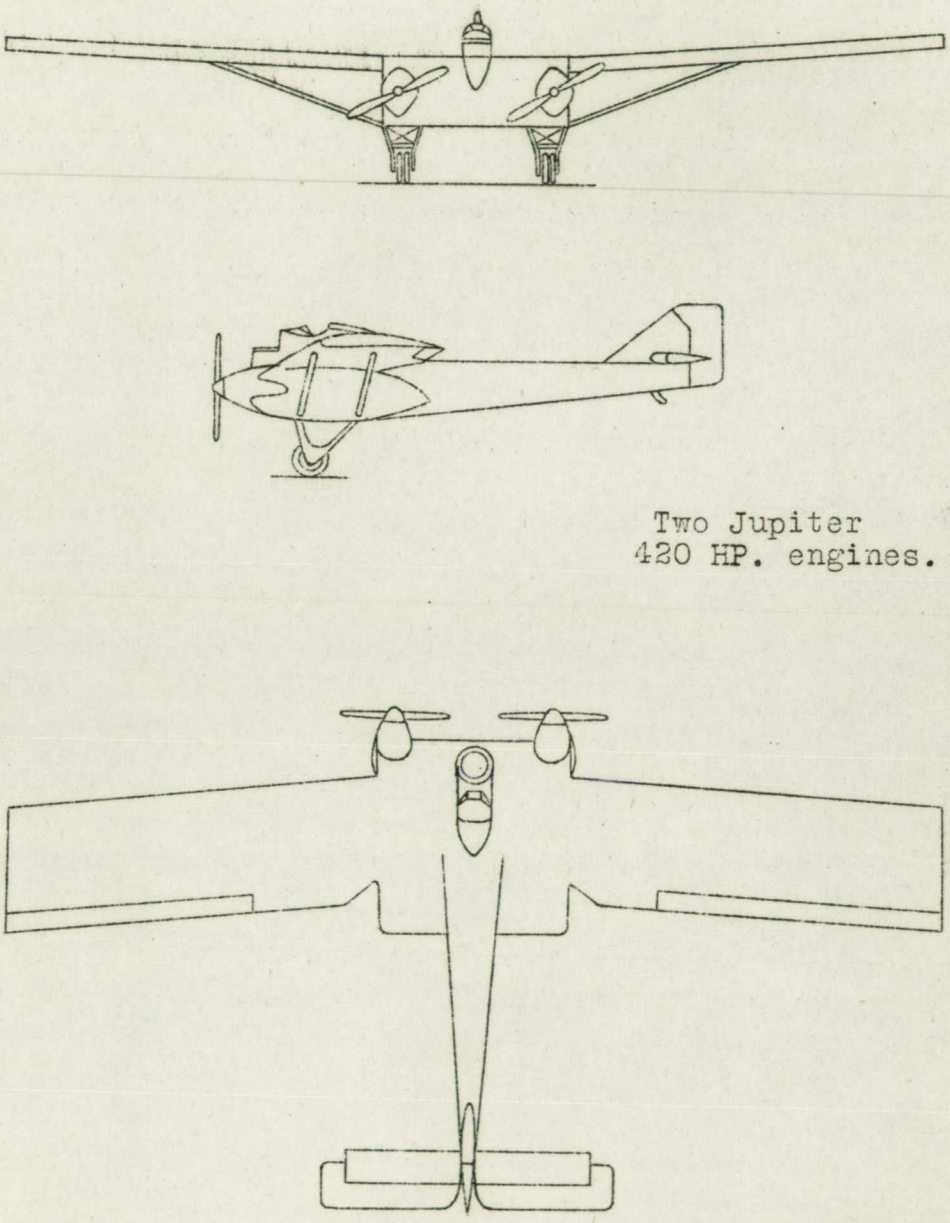


Fig.1 Dyle and Bacalan D.B.10 airplane.

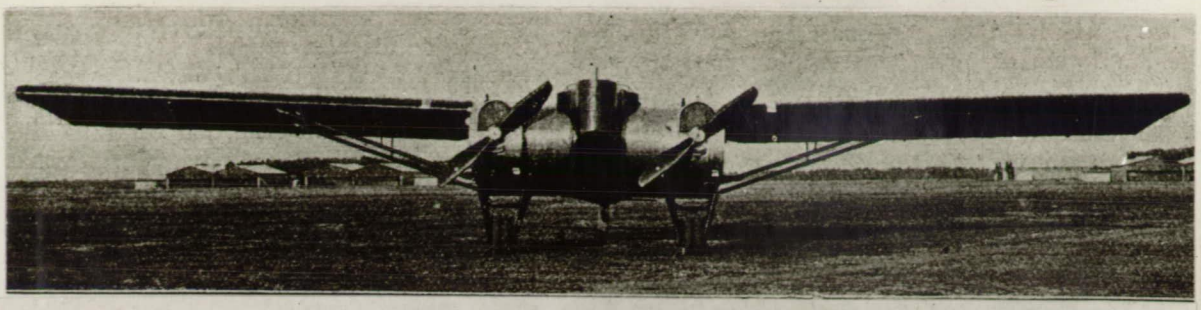
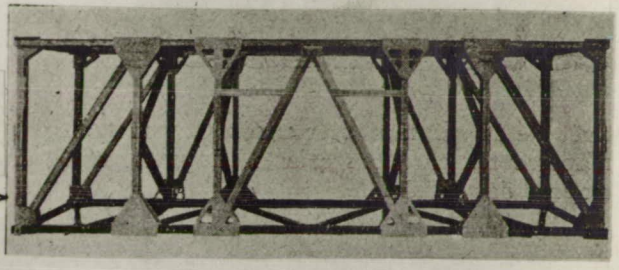


Fig.2 Dyle & Bacalan D.B.10 airplane with two Lorraine 450 HP. engines.

With two Jupiter 420 HP. engines.

Framework of central section.



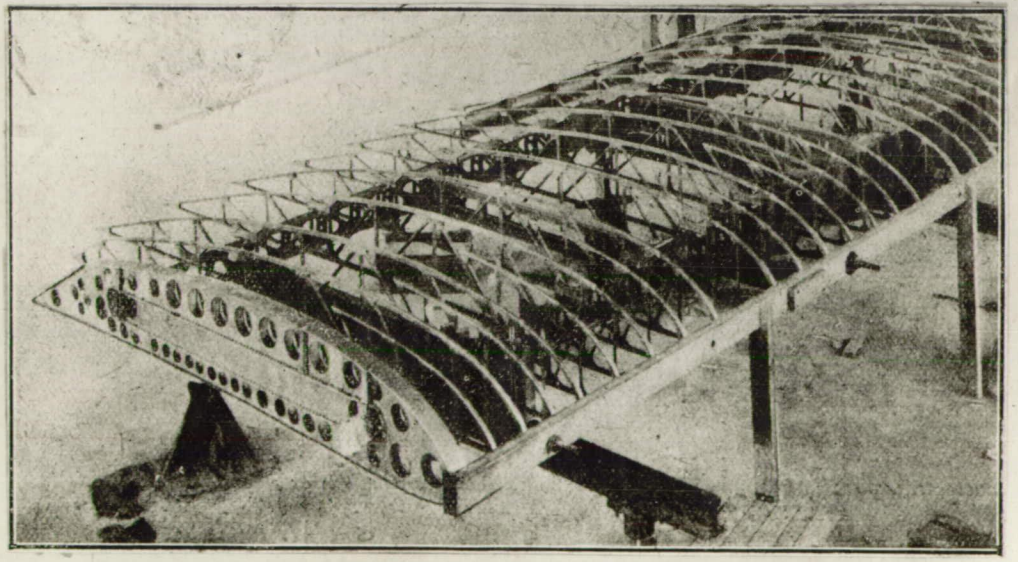


Fig.3 Skeleton of wing of the Dyle & Bacalan D.B.10 airplane.